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EXAMINER

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**BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES**

Application Number: 09/581,990
Filing Date: June 21, 2000
Appellant(s): BAR-EREZ, YOSI

MAILED
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GROUP 1700

Dr. Mark M. Friedman
For Appellant

SUPPLEMENTAL EXAMINER'S ANSWER

This is in response to the appeal brief filed September 7, 2005 appealing from the Office action mailed May 5, 2004.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

No amendment after final has been filed.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

5,730,817	Feygin et al.	3-1998
6,136,132	Kinzie	10-2000
4,721,453	Belanger, Jr.	1-1988
5,071,503	Berman	12-1991
6,161,604	Richards et al.	12-2000
3,827,625	Miller	8-1974

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claims 26-29 and 51 are rejected under 35 U.S.C. 103(a) as being unpatentable over Feygin et al. (US 5,730,817) in view of Kinzie (US 6,136,132). As to Claims 26 and 51, Feygin et al. discloses a method of making a three-dimensional object (Figure 2) constituted of a plurality of thin preformed sheets (Figure 1, layers 56) each bonded on one side to the next adjacent sheet on its opposite side, with each sheet cut along a contour (Figure 2, contour line) corresponding to the contour of the respective layer constituted by the sheet in the object, the method comprising bonding one side of a sheet to the opposite side of an adjacent sheet such that the remaining portion of the sheet not within the contour is readily separable from the three-dimensional object

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(Figure 2, cross hatching 82; column 5, lines 55-67; column 6, lines 1-2). Feygin et al. does not disclose the selective deployment of a releasing agent on one side of the sheet. One of ordinary skill in the art at the time of the invention would recognize the advantage of preventing the waste material from undesirably adhering to the sheets forming the three-dimensional object. Kinzie discloses a method of making a three-dimensional object in which a release coating is applied to prevent undesired adhesion (column 12, lines 4-9). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the method of Feygin et al. to include selectively coating the top side of each sheet with a releasing agent as disclosed by Kinzie to prevent undesired adhesion of the portion of the sheet comprising waste material to the portion of the sheet comprising a layer of the three-dimensional object.

As to Claim 27, the references as combined (Feygin et al., column 8, lines 15-17; Kinzie, column 12, lines 4-9) disclose a method in which the bottom side of each sheet is covered on its complete surface with an adhesive to promote bonding of all the sheets to form the three-dimensional object except where covered by the releasing agent.

As to Claim 28, the references as combined (Feygin et al., column 8, lines 15-17; Kinzie, column 12, lines 4-9) disclose a method in which the adhesive is applied to the under surface of the sheets and the releasing agent is applied to the upper surfaces of the sheets.

As to Claim 29, the references as combined (Feygin et al., Figure 1, layers 56, stack 58, work table 130; column 7, lines 54-57) disclose a method in which the sheets

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are individually fed to and stacked on a horizontal table, which is successively lowered as the sheets, are successively stacked thereon.

Claim 30 and 35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Feygin et al. (US 5,730,817) and Kinzie (US 6,136,132) as applied to claim 29 above, and further in view of Belanger, Jr. (US 4,721,453). The references as combined do not disclose coating each sheet on its upper surface outside of its respective contour with a releasing agent as the sheet is fed to the horizontal table to be stacked on top of the other sheets. Belanger, Jr. discloses an apparatus which utilizes a release agent applicator to coat the upper surface of a web being fed through a manufacturing operation (Figure 1, sprayer 36; column 3, lines 18-24). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the method of the references as combined to include applying a releasing agent to the top side of each sheet as the sheet is fed to horizontal table as disclosed by Belanger, Jr. to prevent undesired adhesion of the portion of the sheet comprising waste material to the portion of the sheet comprising a layer of the three-dimensional object yet provide a time efficient process by combining the time required to apply the releasing agent and the time required to transport the sheet to the horizontal table.

As to Claim 35, the references as combined (Feygin et al., column 8, lines 15-17) disclose a method in which each sheet is pre-coated on its lower surface with adhesive.

Claims 31-33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Feygin et al. (US 5,730,817), Kinzie (US 6,136,132), and Belanger, Jr. (US 4,721,453) as applied to claim 30 above, and further in view of Berman (US 5,071,503). As to Claims 31 and 32, the references as combined do not disclose applying the releasing agent with a releasing agent applicator controlled to selectively apply the releasing agent while the sheet is moving or being held stationary. Belanger, Jr. discloses an apparatus which utilizes a release agent applicator to coat the upper surface of a web being fed through a manufacturing operation (Figure 1, sprayer 36; column 3, lines 18-24). Berman discloses an applicator device for making three-dimensional objects, which selectively coats an upper surface of a stationary web (Figure 1, applicator 24). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the method of the references as combined to provide the releasing agent via an applicator such as that disclosed by Belanger, Jr. to selectively apply the releasing agent while the sheet is being moved or an applicator such as that disclosed by Berman to selectively apply the releasing agent to stationary sheets.

As to Claim 33, the references as combined (Feygin et al., Figure 2, contour line 80, forming tool 46; column 5, lines 51-56) disclose a method in which each sheet is cut along its respective contour by a cutting tool which is driven in two dimensions to trace the respected contour while the sheet is stationary.

Claim 34 is rejected under 35 U.S.C. 103(a) as being unpatentable over Feygin et al. (US 5,730,817), Kinzie (US 6,136,132), and Belanger, Jr. (US 4,721,453) as

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applied to claim 30 above, and further in view of Richards et al. (US 6,161,604). The references as combined (Feygin et al., column 8, lines 15-17) disclose a method in which each sheet is coated on its complete lower surface with adhesive, but do not disclose coating each sheet with adhesive as it is being fed to the horizontal table. Richards et al. discloses a method, which includes coating a completed surface of a web material with adhesive as it is being fed for additional manufacturing operations (Figure 2, adhesive applicator 295). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the method of Feygin et al. to include an adhesive applying step such as disclosed by Richards et al. to eliminate the need for using costly web material that is pre-coated with adhesive.

Claims 36-41 and 43 are rejected under 35 U.S.C. 103(a) as being unpatentable over Feygin et al. (US 5,730,817) in view of Kinzie (US 6,136,132) and Belanger, Jr. (US 4,721,453). As to Claims 36, 37, 40, and 41, Feygin et al. discloses an apparatus for making a three-dimensional object (Figure 2) constituted of a plurality of thin preformed sheets (Figure 1, layers 56) each bonded on one side to the next adjacent sheet on its opposite side, with each sheet cut along a contour (Figure 2, contour line) corresponding to the contour of the respective layer constituted by the sheet in the object, the apparatus comprising bonding one side of a sheet to the opposite side of an adjacent sheet such that the remaining portion of the sheet not within the contour is readily separable from the three-dimensional object (Figure 2, cross hatching 82; column 5, lines 55-67; column 6, lines 1-2). Feygin et al. does not disclose a releasing

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agent applicator. One of ordinary skill in the art at the time of the invention would recognize the advantage of preventing the waste material from undesirably adhering to the sheets forming the three-dimensional object. Kinzie discloses a method of making a three-dimensional object in which a release coating is applied to prevent undesired adhesion (column 12, lines 4-9). Belanger, Jr. discloses an apparatus which utilizing a release agent applicator which coats the upper surface of a moving web being fed through a manufacturing operations (Figure 1, sprayer 36; column 3, lines 18-24). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the apparatus of Feygin et al. to include a releasing agent applicator such as that disclosed by Belanger, Jr. for selectively coating the top side of each fed sheet with a releasing agent as disclosed by Kinzie to prevent undesired adhesion of the portion of the sheet comprising waste material to the portion of the sheet comprising a layer of the three-dimensional object.

As to Claim 38, the references as combined (Feygin et al., Figure 1, work table 130, elevator mechanism 131) disclose an apparatus which includes a horizontal table; a feeder for feeding the sheets individually to, and stacking them on, the horizontal table; and a drive for lowering the table as the sheets are successively stacked thereon.

As to Claim 39, the references as combined (Feygin et al., Figure 1, elevator mechanism 131, motor 132, threaded shaft 134, column 7, lines 54-65) disclose an apparatus in which the drive includes a rotary motor and screws driven by the motor and coupled to the corners of the horizontal table for raising and lower the table.

As to Claim 43, the references as combined (Feygin et al., Figure 2, contour line 80, forming tool 46; column 5, lines 51-56) disclose an apparatus in which the cutting tool is driven in two dimensions to trace the respective contour of the sheet while the sheet is stationary.

Claims 42 and 44 are rejected under 35 U.S.C. 103(a) as being unpatentable over Feygin et al. (US 5,730,817), Kinzie (US 6,136,132), and Belanger, Jr. (US 4,721,453) as applied to claim 40 above, and further in view of Berman (US 5,071,503). As to Claim 42, the references as combined do not disclose applying the releasing agent with a movable releasing agent applicator controlled to selectively apply the releasing agent while the sheet is being held stationary. Berman discloses an applicator device for making three-dimensional objects, which selectively coats an upper surface of a stationary web (Figure 1, applicator 24). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the apparatus of the references as combined to include a moving applicator such as that disclosed by Berman to selectively apply the releasing agent to stationary sheets.

As to Claim 44, the references as combined do not disclose an apparatus in which the releasing agent applicator and the cutting tool are carried by a common head. Berman discloses an apparatus for making three-dimensional objects in which an applicator tool and a cutting tool are carried by a common head which is driven in two dimensions to define the contour of a sheet (Figure 1, movable head 22, applicator 24, cutting tool 26; abstract). It would have been obvious to one of ordinary skill in the art at

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the time of the invention to modify the apparatus of the references as combined to place the releasing agent applicator and the cutting tool onto a common head as disclosed by Berman to eliminate the need for two separate tools and their respective means for movement.

Claim 45 is rejected under 35 U.S.C. 103(a) as being unpatentable over Feygin et al. (US 5,730,817), Kinzie (US 6,136,132), and Belanger, Jr. (US 4,721,453) as applied to claim 40 above, and further in view of Richards et al. (US 6,161,604). The references as combined (Feygin et al., Figure 2, adhesive applicator 295) disclose an apparatus in which each sheet is coated on its complete lower surface with adhesive, but does not disclose an adhesive applicator for coating each sheet with adhesive as it is being fed to the horizontal table. Richards et al. disclose an apparatus, which includes coating a completed surface of a web material with adhesive applicator as it is being fed for additional manufacturing operations (Figure 2, adhesive applicator 295). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the apparatus of the references as combined to include an adhesive applicator such as disclosed by Richards et al. to eliminate the need for using costly web material that is pre-coated with adhesive.

Claim 52 is rejected under 35 U.S.C. 103(a) as being unpatentable over Feygin et al. (US 5,730,817) and Kinzie (US 6,136,132) as applied to claim 26 above, and further in view of Miller (US 3,827,625). The references as combined do not disclose a

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method in which the selective application of the releasing agent is effected by selective removal of coating of the releasing agent. Miller discloses applying a release coating in a predetermined pattern or as a smooth coating and selectively removing portions of it (column 2, lines 12-15). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the method of the references as combined to include applying the releasing coating as a smooth coating and selectively removing portions of it as disclosed by Miller to provide a desired pattern of the release coating such that it only covers areas in which adhesion of the layers of the three-dimensional object is undesired.

This rejection was set forth in a prior Office Action, mailed on May 5, 2004.

(10) Response to Argument

In response to the appellant's arguments that Feygin et al. does not in any way hint or suggest that selective non-adhesion would be advantageous, the examiner agrees that Feygin et al. does not disclose a method which utilizes selective non-adhesion, but notes that Feygin et al. does disclose a method in which waste material can be easily removed from a contoured three-dimensional object and in which the waste removal process can be effected through a variety of methods (column 5, line 56 through column 6, line 2). The examiner asserts that the desire to separate the waste material from the three-dimensional object would motivate one of ordinary skill in the art

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to consider alternative methods, e.g. methods utilizing selective non-adhesion, for eliciting easier separation of the waste material from the three-dimensional object.

In response to the appellant's arguments that since Feygin et al. explicitly teaches a technique for facilitating detachment of waste material, one ordinarily skilled in the art would have no motivation to seek an alternative solution, the examiner disagrees and notes that Feygin et al. discloses that the residue material can be removed by a variety of methods, only one of which is the cross-hatching method (column 5, line 5 through column 6, line 1). Since the disclosed invention of Feygin et al. is not limited to utilizing a particular method for removing the scrap material, the examiner asserts that one of ordinary skill in the art would be motivated to seek out other solutions for removing the unwanted scrap material, such as the method disclosed by Kinzie which teaches the use of a selectively applied release agent.

In response to the appellant's arguments that one ordinarily skilled in the art attempting to implement a thin-sheet model building system according to the teachings of Feygin et al. would not look to Kinzie for teachings of suitable bonding techniques, the examiner notes that the disclosure of Feygin et al. is relied upon to teach the use of a selectively applied release agent, not bonding techniques as asserted by the appellant. The examiner further asserts that one of ordinary skill in the art would look to Kinzie to find teachings related to the field of applicant's endeavor, i.e. the manufacture of a three-dimensional object which includes constructing the three-dimensional object by laminating a plurality of individually contoured layers, as well as to find art which is reasonably pertinent to the particular problem with which the applicant is concerned, i.e.

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the separation of a contoured three-dimensional object from surrounding waste material.

In response to the appellant's arguments that the combination suggested by the examiner would lead to highly undesirable results because the application of the release agent to prevent adhesion around the object would disrupt the binding between adjacent layers of the cross-hatched residue material around the object and that the proposed modification would render the prior art invention being modified unsatisfactory for its intended purposes, the examiner disagrees and notes that while Feygin et al. discloses an embodiment which employs a cross-hatching process for facilitating the removal of the waste material, Feygin et al. clearly states that other methods can be utilized to remove the waste material (column 5, lines 56 through column 6, line 2). Therefore, when modifying the disclosed invention of Feygin et al. to include utilizing a release agent as suggested by Kinzie, the examiner maintains that it would have been obvious to one of ordinary skill in the art to use a release agent in lieu of employing the cross-hatching method to remove the waste material from the three-dimensional object, rather than use the release agent in combination with the cross-hatching method.

In response to the appellant's arguments that when Feygin et al. and Kinzie each are considered as a whole they lack any suggestion of the desirability of selectively coating the top side of each sheet of Feygin et al. with a release agent as disclosed by Kinzie to prevent undesired adhesion of the portion of the sheet comprising waste material to the portion of the sheet comprising a layer of the three-dimensional object, the examiner disagrees and notes that Kinzie discloses a method of making a three-

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dimensional object in which a release coating is selectively applied in conjunction with an adhesive bonding step (column 12, lines 4-9). While Kinzie does not explicitly disclose the specific details of how the release agent is applied, it is noted that Kinzie does disclose an applicator (Figure 6, robot arm 92) which is capable of applying an adhesive bonding material to the top side of each supply block. When modifying the disclosed invention of Feygin et al. to include the application of a release agent in conjunction with the lamination step, the examiner asserts that it would have been readily apparent to one of ordinary skill in the art to utilize the applicator disclosed by Kinzie to selectively apply the release agent to the top side of each sheet of Feygin et al. Therefore, the examiner maintains that the references as combined provide sufficient disclosure for a method which includes selectively coating the top side of each sheet of Feygin et al. with a release agent as disclosed by Kinzie.

In response to applicant's argument that the examiner's conclusion of obviousness is based upon improper hindsight reasoning, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971).

In response to the appellant's arguments that the combination suggested by the examiner lacks a reasonable expectation of success, as noted above the use of cross-

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hatching for removing the waste material was substituted with the use of another method for removing the waste material, i.e. the selective application of a release agent. Regarding the appellant's arguments that one ordinarily skilled in the art would have dismissed the use the Kinzie's volatile solvent as unsuitable for combination with the laser-cutting system of Feygin et al., the examiner asserts then when modifying the method of Feygin et al. to include a step of selectively applying a release coating to prevent the undesired adhesion of the portion of sheet comprising waste material to the portion of the sheet comprising a layer of the three-dimension object, one of ordinary skill in the art at would recognize that the coordinated use of a volatile solvent with the bonding step would not be necessary to integrate a step of selectively applying a release coating as disclosed by Kinzie to the layers forming the three-dimensional object of Feygin et al. and that it would have been readily apparent to one of ordinary skill in the art at the time of the invention that the release coating applied alone would be sufficient to provide the method of Feygin et al. with means for preventing the waste material from undesirably adhering to the sheets forming the three-dimensional object thereby facilitating the removal of the waste material from the three-dimensional object.

In response to the appellant's arguments that the context in which Belanger, Jr. teaches the use of a releasing agent is so removed from the problem solved by the present invention that one familiar with Feygin et al. would not be expected to turn to Belanger, Jr. for a solution to the issue of joining two layers, specific portions of which are permanently bounded together while other portions are not bonded at all, the examiner notes that the reference of Belanger, Jr. is only being relied upon to disclose

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conventional means for applying a release agent and asserts that the references as combined, i.e. the reference of Feygin et al. as modified with the teachings of Kinzie and Belanger, Jr., meet the limitations of the claims.

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,



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November 22, 2005

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